



Biodegradable Polymers and Sustainable Materials: The Future of Green Chemistry

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DESCRIPTION

In a world grappling with the consequences of plastic pollution and environmental degradation, degradable products offer a glimmer of hope. These innovative solutions are designed to break down more quickly and safely than conventional materials, reducing their long-term impact on the environment. As industries and consumers become increasingly aware of their ecological footprints, the development and adoption of degradable products are gaining momentum as part of the broader push towards sustainability. Degradable products are designed to undergo physical, chemical, or biological processes that lead to their breakdown over time. Unlike traditional plastics, which can persist in the environment for centuries, degradable products aim to minimize waste and lessen environmental harm. These materials are broken down by microorganisms such as bacteria and fungi into natural components like water, carbon dioxide, and biomass. Examples include compostable packaging made from corn-starch, paper, and certain biodegradable polymers. These products contain additives that promote degradation through oxidation when exposed to sunlight, heat, or oxygen. They are often used in plastic bags and other packaging materials. However, the degradation process can still leave micro plastic fragments, raising concerns about their environmental benefits. Designed to break down when exposed to ultraviolet light, these materials are particularly useful in outdoor applications where sunlight accelerates their degradation. Photodegradable plastics are used in agricultural films and some types of packaging. By breaking down more quickly than traditional plastics, degradable products help mitigate the accumulation of waste in landfills and natural habitats. This reduction in persistent waste can alleviate pollution and its adverse effects on wildlife. Many degradable products are made from renewable resources such as plant-based materials, which

can lower greenhouse gas emissions compared to fossil fuel based plastics. Biodegradable products can be composted in industrial composting facilities, contributing to the creation of nutrient-rich compost that benefits soil health. There is often confusion about the terms “biodegradable” and “compostable,” leading to potential misuse. Some degradable products may only break down under specific conditions, such as industrial composting environments, and may not degrade properly in natural settings. The breakdown of some degradable products, particularly those that are Oxo degradable, can result in the formation of micro plastics. These tiny particles can persist in the environment and pose risks to marine life and ecosystems. Degradable products can sometimes be more expensive to produce than conventional plastics, and their performance may vary. For instance, certain biodegradable materials might not provide the same durability or shelf life as traditional plastics. The future of degradable products lies in continued innovation and research. Advances in material science and biotechnology are driving the development of new degradable materials with improved performance and environmental benefits. Ongoing efforts aim to create products that not only break down more effectively but also leave no harmful residues behind. In addition to technological advancements, increased consumer awareness and regulatory support are crucial for fostering the adoption of degradable products. Education about proper disposal methods and the benefits of choosing degradable options can help drive positive change.

ACKNOWLEDGEMENT

None.

CONFLICT OF INTEREST

The author's declared that they have no conflict of interest.

Received:	03-December-2024	Manuscript No:	IPGTC-25-22573
Editor assigned:	05-December-2024	PreQC No:	IPGTC-25-22573 (PQ)
Reviewed:	19-December-2024	QC No:	IPGTC-25-22573
Revised:	24-December-2024	Manuscript No:	IPGTC-25-22573 (R)
Published:	31-December-2024	DOI:	10. 21767/2471-9889.10.4.33

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Citation Nasrai R (2024) Biodegradable Polymers and Sustainable Materials: The Future of Green Chemistry. Trends Green Chem. 10:33

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